

CLAIMS

Claim 1. A valve assembly comprising a first valve component, a second valve component mounted to said first valve component, means for rotating said first valve component relative to said second valve component for selectively moving said valve assembly between a closed position and an opened position; a guide element extending from one of the first and second valve components, said guide element comprising means for guiding said valve assembly into retaining means for said valve assembly; and means for removably mounting said valve assembly to a discharge nozzle of a container.

Claim 2. The valve assembly as claimed in Claim 1 wherein said valve assembly is removably mountable to said discharge nozzle of said container such that said container and said first valve component are conjointly rotatable relative to said second valve component.

Claim 3. The valve assembly as claimed in Claim 2 wherein said guide element is adapted to be received in said retaining means for retaining said second valve component fixedly positioned relative to said first valve component, such that rotation of said first valve component relative to said second valve component moves said valve assembly between said closed and opened positions.

Claim 4. The valve assembly as claimed in Claim 1 wherein said first valve component has a top surface defining at least one opening therein; said second valve component has a top surface defining at least one opening therein; said openings in said top surfaces of said first and second valve components being selectively movable into and out of alignment as said first and second valve components are rotated relative to each other for moving said valve assembly between said closed and open positions.

Claim 5. The valve assembly as claimed in Claim 4 wherein said first and second valve components are arranged in said valve assembly such that at least one slot is defined proximate to the top of said second valve component when said first and second valve components are rotatably mounted to each other; and stop means operatively associated with said slot to limit relative rotation of said first and second valve components.

Claim 6. The valve assembly as claimed in Claim 5 wherein said slot is defined such that the length thereof limits maximum relative rotation of said first and second valve components to a fully opened position in which said openings in said top surfaces of said first and second valve components are in complete alignment of said valve assembly in a first rotational direction, and limits maximum relative rotation of said first and second valve components to a fully closed position in which said openings in said top surfaces of said first and second valve

components are completely out of alignment in a second rotational direction opposite to said first rotational direction.

Claim 7. The valve assembly as claimed in Claim 5 wherein said stop means includes an element carried by said first valve component and rotatable therewith, at least a portion of said element being received in said slot.

Claim 8. The valve assembly as claimed in Claim 7 wherein said element further provides retaining means for securing said second valve component mounted to said first valve component for preventing linear displacement of said second valve component relative to said first valve component.

Claim 9. The valve assembly as claimed in Claim 1 wherein said first valve component comprises a flange portion and a hub portion extending from said flange portion, said hub portion being narrower than said flange portion.

Claim 10. The valve assembly as claimed in Claim 9 wherein said second valve component is adapted to be mounted over said hub portion of said first valve component.

Claim 11. The valve assembly as claimed in Claim 10 wherein said second valve component has at least one rib extending from the outer surface thereof.

Claim 12. A container comprising at least a partially hollow housing, said container defining a discharge nozzle, said discharge nozzle defining a discharge opening, said discharge nozzle including means for removably mounting a valve assembly over said discharge opening; said container including at least one tab extending from the outer surface thereof.

Claim 13. The container as claimed in Claim 12 wherein said tab defines at least one opening therein.

Claim 14. The container as claimed in Claim 13 wherein said container has a bottom surface, said bottom surface defining a recessed area therein adapted to receive a discharge nozzle and valve assembly of a second container in stacked relationship with said container.

Claim 15. A system for transferring product between a container and a receptacle, said system comprising:

a container having a discharge opening, and a valve assembly mountable over said discharge opening;

said valve assembly comprising first and second valve components mounted for selective rotation relative to each other in first and second predetermined directions for moving said valve assembly between closed and opened positions;

said valve assembly being mountable to said container such that said first valve component is conjointly rotatable with said container relative to said second valve component;

said valve assembly including a guide element extending from one of the first and second valve components;

a product receptacle, said receptacle defining an inlet opening having a collar fixedly mounted therein;

said collar adapted to receive therein said guide element extending from said valve assembly mounted to said product container for fixedly retaining said second valve component in said collar such that conjoint rotation of said container and said first valve component relative to said second valve component and said collar of said receptacle moves said valve assembly between said closed and opened positions.

Claim 16. The system as claimed in Claim 15 wherein said guide element comprises at least one rib extending from said second valve component, and said collar defines at least one groove for receiving said rib to retain said second valve component in a fixed position relative to said collar when said valve assembly is received in said collar.

Claim 17. The system as claimed in Claim 15 wherein said first valve component defines a flange portion adapted to be

seated on a top surface of said collar when said valve assembly is received in said collar in a predetermined operating position.

Claim 18. The system as claimed in Claim 15 further including a tab carried by said first valve component and movable with said first valve component as said container and said first valve component are rotated conjointly relative to said second valve component fixedly retained in said collar of said receptacle; said tab and said collar being operatively associated with each other such that rotation of said container relative to said receptacle in a first predetermined direction to open said valve assembly causes said tab to cooperate with said collar for preventing said first valve component from being retracted from said collar when said valve assembly is in said opened position.

Claim 19. The system as claimed in Claim 18 wherein said guide element includes a rib extending from said second valve component, said tab element on said first valve component cooperating with said rib on said second valve component such that said tab and said rib are in alignment with each other when said valve assembly is in said closed position, said valve assembly and said collar cooperating with each other such that said valve assembly is receivable in and removable from said collar only when said tab and said rib are in alignment so that said valve assembly is in said closed position.

Claim 20. The system as claimed in Claim 18 wherein said first valve component defines a top surface, said second valve component defines a top surface, and said first and second valve components are arranged such that at least one slot is defined proximate to the top surface of said second valve component; said tab carried by said first valve component being received within said slot for limiting the maximum distance of rotation of said first valve component relative to said second valve component in a first predetermined direction of relative rotation and in an opposed second predetermined direction of relative rotation.

Claim 21. The system as claimed in Claim 20 wherein said top surface of said first valve component defines an opening, said top surface of said second valve component defines an opening, said first and second valve components being arranged such that said openings in the top surfaces thereof are movable into and out of alignment to open and close, respectively, said valve assembly.

Claim 22. The system as claimed in Claim 20 wherein said tab is arranged to retain said first and second valve components mounted to each other by preventing linear displacement of said first and second valve components relative to each other.

Claim 23. The system as claimed in Claim 15 wherein said collar in said receptacle comprises an upper flange, a lower flange, and a sidewall connecting said upper and lower flanges.

Claim 24. The system as claimed in Claim 23 wherein said upper and lower flanges define aligned grooves for receiving said guide element carried by said valve assembly.

Claim 25. The system as claimed in Claim 24 wherein said sidewall of said collar defines a channel, said channel being in alignment with said grooves defined in said upper and lower flanges so as to define a continuous passageway through said collar to receive said guide element carried by said valve assembly.

Claim 26. The valve assembly as claimed in Claim 1 wherein said first valve component defines an opening therein, said second valve component defines an opening therein, said first and second valve components being arranged such that said valve assembly is in an opened position when said openings in said top surfaces of said first and second valve components are at least in partial alignment with each other, and said valve assembly is in said closed position when said openings in said top surfaces of said first and second valve components are completely out of alignment with each other; one of said first and second valve components defining a compartment therein for receiving a resilient element; said resilient element adapted to exert a resilient force on said other of said first and second valve components to urge said valve assembly into said closed position.

Claim 27. The valve assembly as claimed in Claim 26 wherein at least one tab extends outwardly from at least one of said first and second valve components.

Claim 28. The valve assembly as claimed in Claim 27 wherein said tab element defines an opening therein.

Claim 29. The system as claimed in Claim 18 wherein said tab engages said collar by rotating beneath a lower surface of said collar.

Claim 30. The system as claimed in Claim 18 wherein said tab engages said collar by rotating into a channel defined in said collar.

Claim 31. The system as claimed in Claim 19 wherein said collar defines at least one groove, said rib and tab being receivable in said groove only when said valve assembly is in said closed position and said rib and said tab are aligned; said rib and said tab being arranged to cooperate with said groove such that rotation of said tab relative to said rib in a direction to open said valve assembly is prevented by said groove until said valve assembly is seated in a predetermined operating position relative to said collar.

Claim 32. The system as claimed in Claim 19 wherein said first valve component defines a top surface, said second valve

component defines a top surface, and said first and second valve components are arranged such that at least one slot is defined proximate to the top surface of said second valve component; said tab carried by said first valve component being received within said slot for limiting the maximum distance of rotation of said first valve component relative to said second valve component in a first predetermined direction of relative rotation and in an opposed second predetermined direction of relative rotation.

Claim 33. The system as claimed in Claim 32 wherein said top surface of said first valve component defines an opening, said top surface of said second valve component defines an opening, said first and second valve components being arranged such that said openings in the top surfaces thereof are movable into and out of alignment to open and close, respectively, said valve assembly.

Claim 34. The system as claimed in Claim 32 wherein said tab is arranged to retain said first and second valve components mounted to each other by preventing linear displacement of said first and second valve components relative to each other.

Claim 35. The valve assembly as claimed in Claim 4 wherein the top surfaces of both said first and second valve components define more than two openings therein.

Claim 36. The valve assembly as claimed in Claim 35 wherein said top surfaces of said first and second valve components each defined at least six equidistantly spaced openings, said openings in said respective top surfaces being arranged and oriented such that said valve assembly is movable between said closed and opened positions by relative rotation of said first and second valve components not exceeding 30 degrees.

Claim 37. The system as claimed in Claim 21 wherein the top surfaces of both said first and second valve components define more than two openings therein.

Claim 38. The system as claimed in Claim 37 wherein said top surfaces of said first and second valve components each defined at least six equidistantly spaced openings, said openings in said respective top surfaces being arranged and oriented such that said valve assembly is movable between said closed and opened positions by relative rotation of said first and second valve components not exceeding 30 degrees.

Claim 39. The system as claimed in Claim 15 wherein said collar defines at least one vertical groove for receiving therein said guide element extending from said valve assembly, said vertical groove merging with a substantially transversely oriented channel defined in said collar.

Claim 40. The system as claimed in Claim 18 wherein said collar defines a groove therein for receiving said guide element extending from said valve assembly, said groove merging with a substantially transversely oriented channel defined in said collar for receiving said tab element rotatable with said first valve component when said valve assembly is received in said collar and rotated in said first predetermined direction relative to said collar to open said valve assembly.